# ANTS OF THE GENUS ACROPYGA ROGER, WITH DESCRIPTION OF A NEW SPECIES

By William Morton Wheeler

Within recent years Acropyga, which seemed to be a rather insignificant genus of tropical Formicine ants, has been acquiring a reputation as a serious though indirect pest in certain South American countries. The receipt of an undescribed species of this genus together with its very interesting symbiotic coccids from Mr. E. J. H. Berwick of the Imperial College of Tropical Agriculture in Trinidad, B. W. I., has led me therefore to review briefly some of the published accounts of these insects.

Emery, in the "Genera Insectorum" (1925), has divided the genus Acropyga into four subgenera: Acropyga *s. str.* (5 species), Rhizomyrma Forel (18 species), Atopodon Forel (5 species) and Malacomyrma Emery, with a single species. Acropyga and Atopodon are confined to the Indomalayan and Papuo-Australian regions. Rhizomyrma has a similar distribution in the Old World but is also represented and by an even greater number of species in Middle and South America and in the Antilles. The single species of Malacomyrma (*M. silvestrii* Emery) is known only from Eritrea. At first sight the workers of all four subgenera closely resemble those of our North American species of Lasius of the subgenus Acanthomyops Mayr in their small size, smooth, yellow integument and small or vestigial eyes, but closer examination shows that they are peculiar in having a reduced and variable number of antennal joints in all three castes. Moreover, like the species of Acanthomyops, all the Acropygae are exquisitely hypogaeic, or subterranean ants devoted to fostering and disseminating root-coccids. Since the ants and their cherished coccids may be locally very numerous, especially in plantations, it is easy to see how certain economic plants may suffer serious injury through loss of sap or more indirectly, as will be shown in the sequel, by infection with pathogenic organisms transmitted by the coccids, after they have been transported to healthy plants by their hosts. The following accounts, with one exception, refer to species of Rhizomyrma and their coccids.

Professor E. A. Goeldi, in 1892, while studying extensive injury to coffee in the state of Rio de Janeiro, Brazil, observed that the roots of the plants were infested with coccids, which he referred to the genus Dactylopius but which in all probability belonged to the species since called *Rhizoecus coffeae* by Laing, and that these insects were attended by small yellow ants. The latter were identified by Mayr as *Acropyga decedens* Mayr (described in 1887 as *Brachymyrmex decedens*) but were recognized by Forel in 1893 as a different species and named *Rhizomyrma goeldii.*

More recently, Rev. D. Pickel (1927) and Da Costa Lima (1928) have investigated similar and wide-spread injury to coffee plants in the states of Parahyba and Pernambuco, Brazil, and have attributed it to the same coccids and accompanying ants. These, however, were found by Rev. T. Borgmeier (1927) to differ specifically from *R. goeldii* and were therefore described as *R. pickeli.*[1]

Much additional light has been cast on the activities of Rhizomyrma and its coccids by Dr. G. H. Bünzli's investigations of 1932. I am unable to find that these have been published and therefore quote two paragraphs from his letters of March 12th and July 2nd of that year. In the former he writes: "During the past year I have been actively investigating anew the sieve-tube disease of coffee in collaboration with Prof. Stahel, director of the Agricultural Experiment Station at Paramaribo and have been assigned to the field work and study of practical control measures. After Prof. Stahel had demonstrated the presence of a flagellate (*Phytomonas leptovasorum*) in coffee plants and was able to ob-

[1]Da Costa Lima (1931) claims that "*decedens, goeldii* and *pickeli* are perfectly similar forms of the very same species, *Acropyga* (*Rhizomyrma*) *decedens* (Mayr 1887)," but Emery's figure (1905) of *decedens* shows important differences from all the other known species of Rhizomyrma in the shape of the head and mandibles, and all of Emery's published drawings are remarkably accurate. Furthermore, cotypes of *goeldii* in my collection and cotype specimens of *pickeli* received from Father Borgmeier show that the two species are distinct. The fact that all three ants cultivate the same species of coccid on the roots of the same plant does not, of course, imply that they are cospecific. In Surinam Bünzli has found that another very different subterranean ant, *Tranopelta gilva* Mayr, cultivates the same coccid on the roots of coffee plants.

tain, by means of root-grafting, proof of its hitherto overlooked infectivity, it seemed very probable that the disease was carried by root-infesting Hemiptera. Because Dr. H. Rheijne had begun entomological investigations of this problem in Surinam as early as the year 1895 I took up the work anew and am at present engaged with the coccids *Rhizoecus coffeae, Geococcus radicum* and *Orthesiopoda rheijnei.* Since *R. coffeae,* as Van Dijk here and Pickel, Da Costa Lima and Borgmeier in Brazil have already shown, lives in symbiosis with ants [erroneously regarded as *Acropyga pickeli,* but since described as *A. paramaribensis* by Borgmeier], the injury, even if it should prove not to be transmitted by the coccid, is due in great measure to this symbiosis, as control experiments in Brazil have shown during 1927 and 1928. I have devoted some attention to the ants occurring in coccid-infested coffee-plantations and send you a small collection with a request for identification." In the second letter Bünzli writes as follows: "In the meantime I have succeeded in demonstrating that the females of the Acropyga during their nuptial flight disseminated the coccids in great numbers and thus cause the infectious phloëmnecrosis on which Prof. Stahel has been working since 1917 (he discovered the infective agent, Phytomonas, in 1930). The epidemic occurrence of the disease is thus completely explained, and I shall be glad to inform you of my results on the practical control measures as soon as possible. The same sieve-tube disease seems to have broken out in Brazil (Pernambuco) and has been traced to *Rhizoecus coffeae* and *Acropyga pickeli,* although its true cause was not known. Rhizococcus is the vector of the infection!"

The material received from Dr. Bünzli comprised besides the Rhizomyrma and its coccids several mites and Clavigerid and Staphylinid beetles that live in their labyrinthine nests about the coffee roots and a series of ants that prey on the Rhizomyrma and its wards. These enemies belong to the following species: *Paratrechina longicornis* Latr., *Pheidole fallax jelskii* Mayr, *Pheidole subarmata* Mayr, *Solenopsis* (*Diplorhoptrum*) *hermione* Wheeler and *S.* (*D.*) *minutissima* Emery. There were also numerous workers of *Tranopelta gilva* Mayr which were attending Rhizoecus and two species of small fungus-growing ants of

the genera Trachymyrmex and Myrmicocrypta (*T. relictus* Borgmeier and *M. buenzlii* Borgmeier) which were common in areas infested by *R. paramaribensis* and its coccids.

According to Crawley (1921), the workers from which he described *Rhizomyrma marshalli,* a species characterized by its very short, broad head and partially subdivided second funicular joint, were taken in Barbados by J. R. Bovell "in soil round a sugar-cane-root." It is probable, therefore, that this ant also cultivates coccids on the roots of an important food-plant and under certain circumstances might acquire some economic importance. Santschi (1929) mentions that his *R. bruchi* from the Argentine is "coccidophile."

The habits of the Old World Acropygas are very similar to those of the Neotropical region but, with the exception of the new species described below, the associated coccids seem to be very different. In 1924 Silvestri described a singular coccid, *Xenococcus annandalei,* taken by Dr. N. Annandale on the roots of *Ficus obtusa* in the nests of *Acropyga acutiventris* Roger on Barkuda Island, in Chilka Lake, Madras District, India. He cites the following remarks of Annandale, which are interesting in connection with the above quoted observations of Bünzli: "Xenococcus is invariably found in the nests of the little yellow ant *Acropyga acutiventris* on the rootlets of various trees of the genus Ficus. In cold and dry weather both ants and coccids retire deep into the ground, but so long as the soil is damp and warm they remain under stones just below the surface. The workers of the ants are entirely subterranean in habit and the males and females apparently stay for some time in the nest after hatching from their cocoons before leaving to form new colonies. If the nest is disturbed the females as well as the workers carry off the coccids. When they leave the nest each female carries in her jaws a female of the coccid as a kind of dowry. This accounts for the universal distribution of the coccid in the nests of the ant, in which a very peculiar, blind, small, colorless Isopod is also usually to be found."

A few years later, Silvestri (1926) described an even more aberrant coccid, allied to Xenococcus but very different in the shape of the body, in having small biarticulate instead of large

quadriarticulate antennæ and in lacking urosternal glands, as *Eumyrmococcus smithi,* which he found on two occasions in nests of *Rhizomyrma sauteri* Forel near Macao and Taipò Market, China. The subterranean galleries were under stones or in humus surrounding the roots of an unidentified plant. Subsequently he collected the same coccid with the same ant at Ziccavei, near Shanghai, and observed the disturbed workers carrying away some of the coccids while others remained attached to the plant-roots by means of their beaks.

Now unusual interest attaches to the species of Acropyga (Rhizomyrma) received from Mr. Berwick, because its associated coccids must belong either to Silvestri's genus Eumyrmococcus or to some very closely allied genus. In either case the occurrence in tropical America of a very aberrant coccid so closely related to a Chinese species and living in trophobiosis with a closely related species of Rhizomyrma is zoogeographically important. Some of the coccids have been sent to Dr. Harold Morrison for more precise identification.[1] The ant, of which I have received only worker specimens, is here described and figured.

**Acropyga (Rhizomyrma) berwicki** sp. nov.

(Fig. 1)

*Worker.* Length: 1.5–1.8 mm.

Integument thin and collapsable. Head as long as broad, with nearly straight, parallel sides, broadly rounded posterior corners and feebly convex posterior border. Eyes minute but deeply pigmented, consisting of 6 or 7 unequal, indistinct ommatidia, situated at the anterior sixth of the sides of the head. Mandibles narrow, curved, with very oblique apical borders bearing four subequal, acute teeth, the basal tooth separated from the other three by a distinct diastema and in some specimens stouter and less obliquely

[1] After examining the specimens Dr. Morrison reported as follows: "The species is extremely interesting and shows definite affinities with *Eumyrmococcus smithi* Silvestri. From the specimens submitted, we are not able to obtain positive evidence that any adults of the species are included in the lot. So little is known of the different stages of these specialized Coccids that it is within the limits of possibility that these specimens represent immature stages of Silvestri's species. On the other hand, if they are actually adult females then they differ from the Silvestri genus and species to such an extent that, on the basis of our present standards in the Coccidae, a new genus would have to be erected for the reception of this Trinidad species."

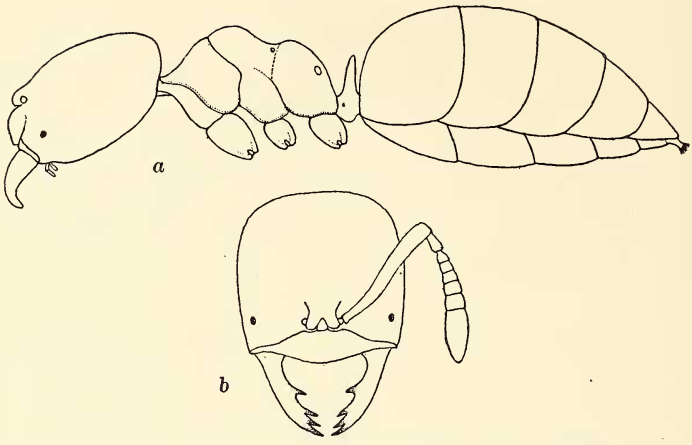


FIG. 1. *Acropyga* (*Rhizomyrma*) *berwicki* sp. nov. Worker; *a*, lateral view; *b*, head, dorsal view.

inserted. Clypeus rather short, convex in the middle, with broadly rounded anterior border. Frontal carinæ small, rounded; frontal area distinct, impressed, subtriangular; frontal groove obsolete. Antennæ 8-jointed; scapes not reaching the posterior border of the head by fully one-fifth of their length; first funicular joint as long as the two succeeding joints together; second joint slightly longer than broad, narrowed at the base; 3–6 distinctly broader than long, increasing gradually in size distally to the terminal joint which is swollen and somewhat longer than the three preceding together. Thorax very short, less than twice as long as broad, widest through the pronotum which is twice as broad as long, in profile rising posteriorly to the mesonotum which is small but convex, sloping posteriorly to the distinct but short mesoëpinotal constriction; epinotum broader than long, broader behind than in front, in profile nearly as high as the mesonotum, with anteriorly rather abruptly convex base passing gradually into the longer, flattened, sloping declivity. Petiole short, convex ventrally, its scale erect, rather small and thin, though thicker at the base than at the superior border, which is blunt, broadly rounded and much lower than the base of the epinotum. Gaster large and convex anteriorly as in the other species of the genus. Fore tarsi slightly dilated.

Shining; mandibles smooth, with a few scattered, piligerous punctures; remainder of body very finely reticulate, or superficially shagreened.

Pilosity and pubescence yellowish, short, erect or suberect, the former dense and abundant, especially on the head, merging with the pilosity which is much sparser and longest on the pro- and mesonotum and tip of gaster.

Pale yellow throughout, except the mandibular teeth which are deep red or dark brown.

Described from 22 specimens taken at San Raphael, Trinidad, by Professor Berwick, who found them in cultivated, cocoa soil. He states that the number of coccids in the nests seemed to be correlated with the number of ants present and that both insects seemed to reach their maximum concentration at depths of 3–5 inches from the surface.

*R. berwicki* is most closely related to *fuhrmanni* Forel of Colombia, but this species has the head more rectangular, distinctly longer than broad and broader in front than behind, with slightly emarginate posterior border, the antennal scapes are longer and the 4-toothed mandibles are widened at the basal tooth, which is not the case in *berwicki*.[1]

Most genera of ants, like most Aculeates, have 12 antennal joints in the female and workers and 13 in the male, but Rhizomyrma shows a peculiar reduction and in some species also considerable inconstancy in these numbers. The following is a list of the 12 Neotropical species of which the workers are known, with date of publication, habitat, body-length and number of antennal joints.

*R. marshalli* Crawley (1921), Barbados. 2 mm.; 10–11.
*R. pickeli* Borgmeier (1927), Brazil, Surinam. 2–2.2 mm.; 10–11.
*R. decedens* Mayr (1887), Brazil. 2–2.5 mm.; 9–11.
*R. goeldii* Forel (1893), Brazil. 2–2.3 mm.; 9–11.
*R. parvidens* Wheeler and Mann (1914), Haiti. 1.8–2 mm.; 10.
*R. bruchi* Santschi (1929), Argentina. 2 mm.; 9.
*R. pachycera* Emery (1905), Brazil. 2.2 mm.; 9.
*R. wheeleri* Mann (1922), Honduras. 1.5 mm.; 9.
*R. exsanguis* Wheeler (1909), Mexico. 1.4–1.6 mm.; 8–9.
*R. fuhrmanni* Forel (1913), Colombia. 1.7–1.9 mm.; 8.
*R. berwicki* sp. nov. Trinidad. 1.5–1.8 mm.; 8.
*R. paramaribensis* Borgmeier, Surinam. 1.8 mm.; 7–8.

The following numbers of antennal joints have been recorded for the known females of

[1] There are several species of Acropyga in Trinidad. Dr. Neal A. Weber has recently sent me at least three other undescribed species of the subgenus which he has taken on the island.

*R. pickeli.* 2.8 mm.; 11.
*R. decedens.* 3–3.3 mm.; 10.
*R. pachycera.* 3.7 mm.; 9.
*R. wheeleri.* 2 mm.; 9.
*R. fuhrmanni.* 2.5–2.7 mm.; 8.
*R. paramaribensis.* 2.5 mm.; 8.
*R. smithi.* 2–2.2 mm.; 7.

*R. smithi* Forel (1893) from St. Vincent, B. W. I., is known only from the female, which is peculiar on account of its small size and 7-jointed antennæ. Forel surmised that its worker must be "d'une exiguité remarquable," but it is probably not much if any smaller than the worker of *berwicki.* The males of only four species are known, namely:

*R. dubitata.* 2 mm.; 12.
*R. decedens.* 2 mm.; 11.
*R. paramaribensis.* 2.2 mm.; 10.
*R. pickeli.* 1.3–1.6 mm.; 9.

Of *R. dubitata* Wheeler and Mann (1914) from Haiti the male is the only known caste unless *R. parvidens* also from Hispaniola, is the worker.

It will be seen, therefore, that within the single subgenus Rhizomyrma the numbers of antennal joints range from 7–11 in the worker and female and from 9–12 in the male, and that there is in all the castes a rough correlation between these numbers and the body-length.

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*South America As I Saw It; the observations of a naturalist on the living conditions of its common people, its topography and products, its animals and plants.* By W. S. Blatchley, 12 mo., cloth, 391 pages, illus., Indianapolis, Ind., Nature Pub. Co., 1934, $2.50.

Any well written account of the rambles of an entomologist must always be of interest to his colleagues. This is especially true when these records cover entomological exploration in a part of the world as rich in opportunities for new entomological discoveries and as fascinatingly alluring in other ways as is South America. In this instance, the narration has been made by the distinguished author of four internationally used entomological monographs having a background of long years of entomological training and experience, and by one who possesses to an unusual degree the power of sustained interest in and graphic visualization of his subject matter.

Based on a daily journal, kept up to date in great detail with scrupulous exactness, there may be found a day to day—nay at times hour to hour—narration of principal events, and descriptions of the places seen during the journey. These entries include such subjects as full discussion of the countries, cities and localities visited whether in valley or on mountain-top, transportation by steamship and by rail, amounts paid for various items of travel, intimate details concerning the habits and daily life of